



# The *Cinmar* discovery and the proposed pre-Late Glacial Maximum occupation of North America

Metin I. Eren<sup>a,b,\*</sup>, Matthew T. Boulanger<sup>a,c,\*\*</sup>, Michael J. O'Brien<sup>a,\*\*\*</sup>

<sup>a</sup> Department of Anthropology, University of Missouri, United States

<sup>b</sup> Department of Archaeology, Cleveland Museum of Natural History, United States

<sup>c</sup> Archaeometry Laboratory, University of Missouri, United States

## ARTICLE INFO

### Article history:

Received 3 February 2015

Received in revised form 28 February 2015

Accepted 2 March 2015

Available online 31 March 2015

### Keywords:

Bi-point

*Cinmar* Biface

Clovis

Peopling of North America

Pre-Clovis

Solutrean

## ABSTRACT

Proponents of a Solutrean colonization of the New World, and a pre-LGM occupation of North America's Mid-Atlantic region, cite as evidence a bifacially flaked, bi-pointed stone blade allegedly dredged from the continental shelf by the crew of the vessel *Cinmar*, along with portions of a mastodon skeleton later directly dated to  $22,760 \pm 90$  RCYBP. However, our investigations into the discovery found several significant inconsistencies with respect to what is currently reported in the literature and raise serious questions that must be addressed before the *Cinmar* artifact can be considered evidence of anything pertinent to archaeology. In this article we present evidence and questions regarding the history of the *Cinmar* discovery, the location of the *Cinmar* discovery site, and the nature of the *Cinmar* vessel itself.

© 2015 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

## 1. Introduction

Several researchers have, over the past two decades, proposed a pre-Late Glacial Maximum (LGM) occupation of North America's Mid-Atlantic region by Solutrean foragers from Europe (Bradley and Stanford, 2004, 2006; Collins et al., 2013; Lowery, 2009; Oppenheimer et al., 2014; Stanford and Bradley 2000, 2002, 2012, 2014; Stanford et al., 2014; Stanford and Stenger, 2014). We and others have countered on various grounds that there is no evidence for this controversial proposal and substantial evidence against it (Boulanger and Eren, 2015; Dulik et al., 2012; Eren et al., 2013, 2014; Eriksson et al., 2012; Goebel et al., 2008; Kashani et al., 2012; Meltzer, 2009; O'Brien et al., 2014a, 2014b; O'Rourke and Raff, 2010; Philips, 2014; Raghavan et al., 2014; Raff and Bolnick, 2014; Rasmussen et al., 2014; Straus, 2000; Straus et al., 2005; Westley and Dix, 2008). Proponents continue to cite as evidence a bifacially flaked, bi-pointed stone blade allegedly dredged from the

continental shelf by the crew of the vessel *Cinmar*, along with portions of a mastodon skeleton later directly dated to  $22,760 \pm 90$  RCYBP (UCIAMS-53545) (Lowery, 2009; Stanford et al., 2014). As we have discussed elsewhere (O'Brien et al., 2014a,b), this date is ca. 2000 calendar years earlier than the earliest appearance of Solutrean culture anywhere in Europe.

Having graced the covers of two books (Stanford and Bradley, 2012; Stanford and Stenger 2014), the *Cinmar* stone blade has been offered as significant evidence in support of the Solutrean hypothesis because it “resemble[s] Solutrean laurel-leaf artifacts of Southwestern Europe” (Collins et al., 2013: 526; also Stanford et al., 2014; but see Boulanger and Eren, 2015). Despite these superficial similarities, or perhaps because of them, Stanford et al. (2014) state that “the question of whether or not the biface was associated with the mastodon remains is critically important for an accurate interpretation.” We agree, which is why we were surprised to find several significant inconsistencies with respect to the history of the *Cinmar* discovery. We believe that they raise serious questions that must be addressed before the *Cinmar* artifact can be considered evidence of anything pertinent to archaeology.

## 2. The reported story and initial minor inconsistencies

There are no first-hand accounts of the recovery of the *Cinmar* biface and the supposedly associated mastodon remains, and all published accounts come from proponents of the Solutrean hypothesis. The first

\* Correspondence to: M.I. Eren, Department of Anthropology, University of Missouri, United States; Department of Archaeology, Cleveland Museum of Natural History, United States.

\*\* Correspondence to: M.T. Boulanger, Archaeometry Laboratory, University of Missouri, United States.

\*\*\* Correspondence to: M.J. O'Brien, Department of Anthropology, University of Missouri, United States.

E-mail addresses: [erenm@missouri.edu](mailto:erenm@missouri.edu) (M.I. Eren), [boulangerm@missouri.edu](mailto:boulangerm@missouri.edu) (M.T. Boulanger), [obrienm@missouri.edu](mailto:obrienm@missouri.edu) (M.J. O'Brien).

published accounting of which we are aware is in Lowery's (2009) dissertation and is based on information that Lowery obtained during a telephone interview with the *Cinmar* captain, Charles Thurston Shawn, on August 7, 2008. Lowery conducted this interview roughly four months after having first observed the *Cinmar* biface and mastodon remains in the Gwynn's Island Museum on Virginia's Middle Peninsula. According to Lowery's account, Captain Shawn and the crew of the scallop trawler *Cinmar* were working "approximately 40 nautical miles" (ca. 74 km) east of the Virginia Capes and were dredging at a depth of 70–74 m (Lowery, 2009: 190). Shawn "confirmed that the items were discovered in 1970" and indicated to Lowery that he "took particular note of the water depth" and "plotted the area on his navigation charts" (Lowery, 2009: 190). The only information Lowery provided about the exact circumstances of the discovery is that the biface and the mastodon remains were "discovered at the same time" (Lowery, 2009: 190). He does not indicate how these materials came to be in the museum.

Stanford and Bradley (2012) provide a second account of the recovery, largely reiterating Lowery's account. They add that "[a] label in the [museum] exhibit indicated that in 1970 the crew of the vessel *Cinmar*" encountered the biface and mastodon remains while dredging 100 km east of the Virginia Capes, and that Lowery's later interview with Shawn allowed him to determine that the discovery had been made at a depth of "approximately 75 m" (p. 100). It is unclear whether Lowery determined this depth or whether Shawn specified it. As with Lowery's accounting, no specific information is provided concerning the recovery of these items, and no indication is given as to how they arrived at the Gwynn's Island Museum.

Stanford et al. (2014) provide a third accounting of the recovery of the biface and mastodon remains. In this account, the *Cinmar* is reported to have been dredging 100 km east of the Virginia Capes "at a depth of 70 m" (p. 74). They state that the likelihood is slim that the mastodon remains and the artifact became comingled from two different contexts by the dredge because the *Cinmar* "had just begun a transect" when "the stress caused by the weight of a mastodon skull and associated tusks caused the transect run to be terminated and the dredge pulled and cleaned" (p. 87). There is no indication provided as to the source of this information. Critically, Stanford et al. state that the artifacts "have been on exhibit since 1974" (p. 75). Later they write, "It is important to remember that both the mastodon remains and the biface had also been on display since 1976 with a label outlining the circumstances of their discovery" (p. 88). We'll show the importance of these statements below.

In each of these accounts, Captain Shawn is said to have taken note of the water depth and location of the encounter. The remains were divided among the *Cinmar*'s crew, and Shawn retained for himself a tusk section, a complete tooth, and the biface (Lowery, 2009: 190–191; Stanford et al., 2014: 75). Here, however, the three stories diverge and, in at least some of the details, become contradictory. Neither Lowery (2009) nor Stanford and Bradley (2012) indicate how Shawn's artifact and the mastodon remains came to be on display at the Gwynn's Island Museum. Shawn is said to have had little interest in artifacts or fossils. Stanford et al. (2014) report that at some point Shawn sold the specimens to Dean Parker, an artifact collector living in the area. The sale of the artifacts by Shawn to Parker is not mentioned by either Lowery (2009) or Stanford and Bradley (2012). Parker's involvement in the story seems pertinent to us, both because he was the individual who loaned the items to the Gwynn's Island Museum, where Lowery observed them in spring 2008 (Lowery, 2009: 187; Stanford and Bradley, 2012: 100; Stanford et al., 2014: 75), and because he was an artifact collector. Thus, the omission of any mention of Parker's involvement in earlier accounts of the *Cinmar* finds seems odd.

Jeanne Tanner, director of the Gwynn's Island Museum, provides a fourth accounting of the *Cinmar* discoveries in an on-line interview available on YouTube (PalisadesPrehistory, 2013). To the best of our knowledge, this is the only account of the materials that is publicly available and not given directly by advocates of the Solutrean hypothesis. In it, Tanner notes that Captain Shawn retained the *Cinmar* finds for

"several years" after their discovery around 1972. The finds were then sold to "a local Mathews County [Virginia] man," a reference to Parker, who kept the finds "for a while." Parker loaned the artifacts to the museum, where they stayed for "about another five or six years" before being observed by Lowery. The timeline reconstructed from Tanner's account directly contradicts that given by Stanford et al. (2014). We also note that Tanner specifically mentions that Lowery and Stanford came to the museum one week after Lowery first observed the artifacts. According to her account, this visit concluded with Lowery and Stanford requesting permission from the owner for them to take the materials with them, and that "the owner had no problems with that." Thus, according to Tanner's account, both Lowery and Stanford were aware of Parker's involvement with and ownership of the artifacts before any information about the *Cinmar* materials had been written.

### 3. Questions

#### 3.1. Question 1: what is the actual history of the find?

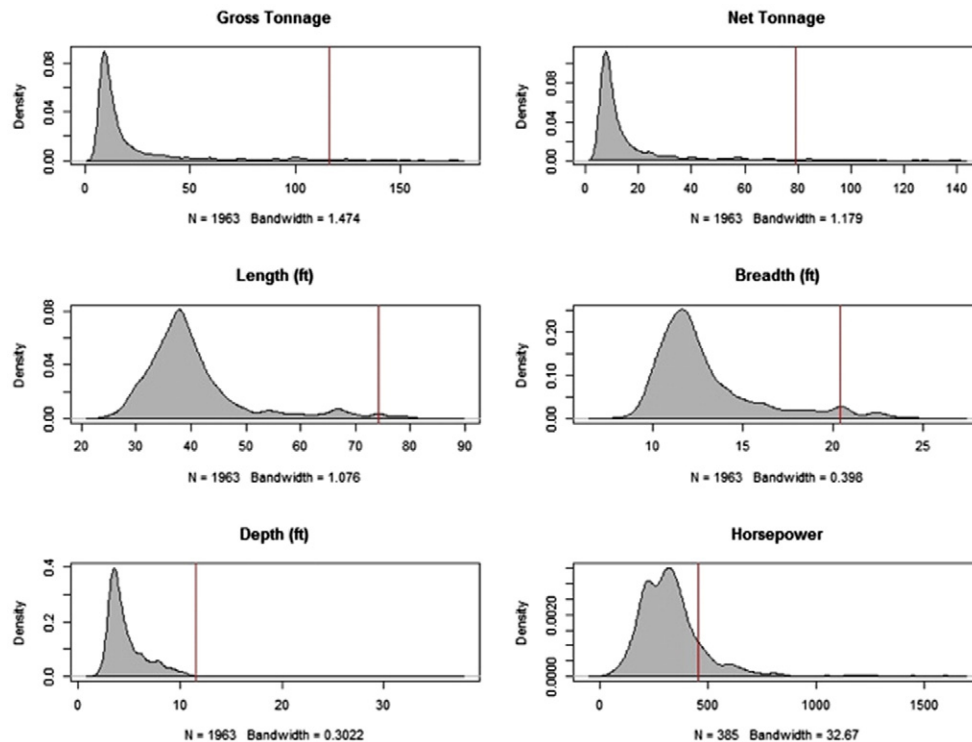
In our minds, the first question that must be addressed is: When were the biface and mastodon remains found, and when were they actually loaned to the Gwynn's Island Museum? Lowery's initial reporting of these materials states that the ship's captain "confirmed that the items were discovered in 1970" (Lowery, 2009: 190). Stanford, in his October 8, 2008 address to the Nobel Conference 44 at Gustavus Adolphus College, also gives 1970 as the date of the find (Gustavus Adolphus College, 2012). Stanford and Bradley (2012: 100) indicate that a label in the museum indicates that the materials were found in 1970. Stanford et al. (2014: 75), however, state that the materials were dredged in 1974. Though this may appear to some readers to be minor quibbling, we stress that there are clearly differing accounts here that are neither reconciled nor even acknowledged by the authors. Either the label in the museum and Captain Shawn's memory are precise or they are not.

Given Tanner's recounting, we suspect that the *Cinmar* materials could not have been on display since either 1974 (Stanford et al., 2014: 75) or 1976 (Stanford et al., 2014: 88). This supposition is validated by the following facts: The Gwynn's Island Museum was not founded until 1991 (Gwynn's Island Museum, n.d.-a; McCloud, 1991); it did not occupy its present space until 1995 (Marble, 1995); and the second floor—where Tanner recalls having placed the point and the tooth shortly after Parker brought them to the museum—was not renovated and usable until 1997 (Lewis, 2007). Indeed, the Gwynn's Island Museum's own Web site states that the *Cinmar* materials (the biface, the tooth, and a section of tusk) were purchased by Parker and loaned to the museum in 2002 (Gwynn's Island Museum, n.d.-b). How, then, could the *Cinmar* finds have been on display since either 1974 or 1976, as stated by Stanford et al. (2014)? Simply put, they could not have been.

Tanner's account, local newspaper articles of the time, and the Gwynn's Island Museum's own Web site clearly indicate that the *Cinmar* finds were donated at least three years after the trans-Atlantic pre-LGM Solutrean crossing was proposed (Preston, 1997; Stanford, 1999; Stanford and Bradley, 2000), despite claims to the contrary (Stanford et al., 2014). Further, if the artifacts were not donated until 2002, it begs the question of who wrote the museum's label outlining the circumstances of the discovery, when the label was written, and how that person got the information outlining the circumstances of the discovery.

#### 3.2. Question 2: how do pre-LGM advocates know where the *Cinmar* discovery site is located?

Stanford and Bradley (2012) and Stanford et al. (2014) provide detailed information on the underwater location of the *Cinmar* finds. However, as discussed above, both sources state that the vessel was working 100 km east of the Virginia Capes, whereas Lowery (2009) as



**Fig. 1.** Kernel-density estimates of dimensions and engine horsepower for wooden-hulled fishing vessels with construction dates since 1960 and operating in the Mid-Atlantic fishery. Red vertical line represents the *Cinmar*. Data from the U.S. Coast Guard (2014).

well as the maps of Stanford and Bradley (2012) and Stanford et al. (2014) depict the *Cinmar* site as less than 40 nautical miles ( $\approx 74$  km) from the Virginia Capes. These maps depict the *Cinmar* “site” as a point location, implying a high degree of accuracy and precision in the site’s location. The ambiguity in both location (74–100 km) and bathymetry (70–75 m) are not acknowledged, despite the fact that this ambiguity would result in a substantially larger area within which the find spot could be located.

Previous discussions of the *Cinmar* discoveries, including Lowery’s (2009) dissertation, Stanford’s 2008 address at the Nobel Conference (Gustavus Adolphus College, 2012), and a display poster at the Gwynn’s Island Museum (attributed to Stanford) entitled “The *Cinmar* Discovery; Evidence for Ice Age Occupation of the Middle Atlantic Outer Continental Shelf,” have all included the same image of a modern steel-hulled scallop dredger as an example of “a typical commercial fisheries shellfish dredge” (Lowery, 2009: 218). Elsewhere, we expressed concerns regarding the association of the artifact and mastodon remains, particularly given the scale of scallop-dredging equipment and activities (O’Brien et al., 2014a). Citing a technical report published by the National Oceanic and Atmospheric Administration (NOAA) (Stevenson et al., 2004), we noted that the primary scalloping gear in the Mid-Atlantic fishery is the New Bedford scallop dredge, which is typically 4.3 m wide, often used in tandem, and dragged for distances up to ca. 10 km. In their rebuttal to this point, Stanford and Bradley (2014: 618) state that “the *Cinmar* was a wooden dredger built in the 1950s ... It was smaller than modern dredgers and operated with a single winch anchored to a wooden deck [and] it would not have pulled heavy loads or dredged distances [such as those] indicated.” We were surprised that (1) such information had not previously been offered regarding the supposed small scale of the boat and the dredging operations and (2) that no sources were referenced for this information. We return to the description of the *Cinmar* below, but for the moment we focus on the available information concerning the specific location from which the materials were supposedly dredged.

The only way to determine both the location of the *Cinmar* site and whether the biface was originally associated with the mastodon is to find Shawn’s original navigational charts and see exactly what notes were written on them. Lowery (2009: 190) states that Shawn “took particular note of the water depth and indicated [in a telephone interview] that he had plotted the area on his navigation charts.” Lowery, however, does not indicate that he ever observed those charts. Stanford et al. (2014: 74) state, “Shawn carefully plotted the water depth and the exact location of the find on his navigation charts and noted that all of these items were dredged at the same time.” The increase in specificity and detail in Stanford et al.’s account, i.e., “carefully” plotting the “exact” location and depth, suggests that the navigation charts exist and can be used to pinpoint the recovery locality. Yet, Stanford et al. do not state that the charts themselves were observed, and we are not aware of any sources in which these maps have been reproduced or of any statement that they have actually been examined.

We contacted several institutions and agencies, including Calvert Marine Museum, Chesapeake Bay Maritime Museum, Coast Guard Sector Hampton Roads, Ferdinand Hamburger Archives (Milton S. Eisenhower Library, Johns Hopkins University), Hampton Roads Naval Museum, The Mariners’ Museum and Park, the National Vessel Documentation Center, the Port of Virginia, the Virginia Institute of Marine Science, and the USCG Navigation Center & Historian’s Office, but none knows where the *Cinmar*’s charts might be found, or whether they even exist. Our point here is that if Stanford and colleagues are not in possession of the original navigational charts maintained by Captain Shawn, then it doesn’t matter what was written on them or how carefully the “exact” location was recorded; the only “data” or “information” available to locate the find spot comes from what was said during Lowery’s telephone interview with Captain Shawn.

That interview, on August 7, 2008 (Lowery, 2009), occurred 30 days prior to Shawn’s death, on September 7 (Daily Press [Newport News, Virginia], 2008). Pre-LGM advocates have stated that Captain Shawn provided “data” (Lowery, 2009: 213) and “bathymetric [sic]



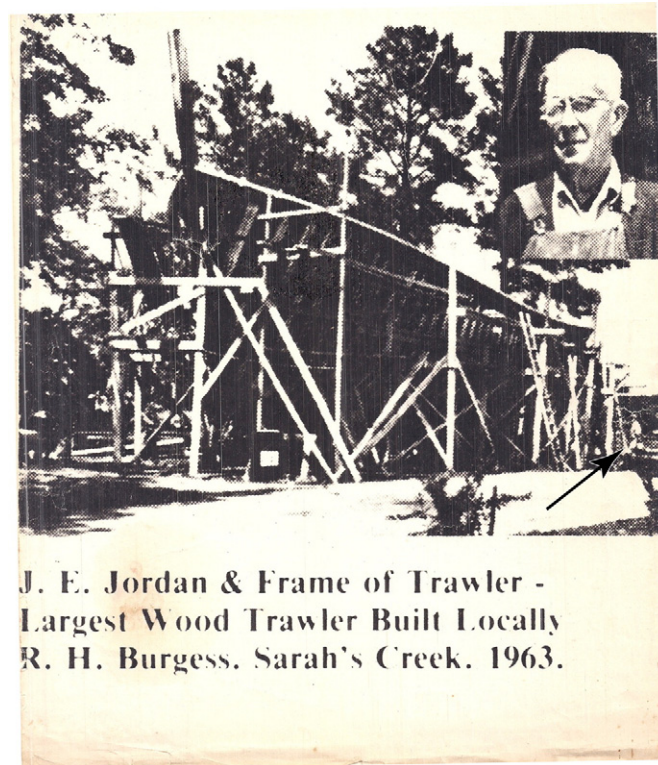
information” (Stanford and Bradley, 2012: 100) from which “Lowery determined” the site’s location, which suggests that specific coordinates were not given. This is not surprising, given that the finds were made prior to commercial availability of global positioning satellite units and that Lowery’s interview was made nearly 40 years after the fact. Yet, in a 2014 lecture (City of Fort Collins, 2014) Stanford states that Captain Shawn “had a LORANS [sic] reading” (the correct spelling is LORAN) on the location of the mastodon site.<sup>1</sup> Given that Captain Shawn died 30 days after his telephone interview with Lowery, thus preventing any follow-up interview, and that all previous descriptions of the information conveyed during this interview mention only bathymetric depths and approximate distance from shore, we question how such information could have been obtained and never previously mentioned. What data or information did Shawn provide in the telephone interview? How did he know this information, where is it located, and is it publically verifiable?

Interestingly, in the same lecture Stanford explained that trawler captains kept “hang logs,” in which they would record LORAN readings when they hit hangs and obstructions. The locational data would then be “passed on to the harbor master” so that other trawlers could avoid the problem areas. We decided to see if Captain Shawn might have passed along any information about the mastodon remains. In 1983 the University of North Carolina compiled a revised list of reported hangs and obstructions, together with LORAN A readings, that was first published in 1975 (McGee and Tillett, 1983). That first publication consisted of “hangs located mainly off Virginia, North Carolina, South Carolina, and Georgia,” with the revision including “hangs recorded along the entire Atlantic Coast of the United States” (McGee and Tillett, 1983: i). On page 47 (of 193) is a notation “‘Cimmar’ hung upon anchor & barge.” If that is a misspelling of “Cinmar,” then the only *Cinmar* hang that we can find that was ever reported to a harbor master was that resulting from a sunken barge, not from mastodon remains.

### 3.3. Question 3: which vessel is the real *Cinmar*?

Stanford and Bradley (2014) provide a black-and-white photograph of a boat purported to be the *Cinmar* and a general description of the vessel, indicating that it was small relative to modern dredgers. They give no indication as to the source of the photograph or of the information concerning the size of the *Cinmar*. We contacted Stanford and Bradley for the source of the image, but in response to our inquiries we were informed that it belongs to an unnamed “private party” that gave them “one-time permission for use”. The claim of “one-time permission for use” seems odd given that Stanford, via an assistant, gave Tia Ghose (2014) permission to re-publish the image on a science news website (Ghose, personal communication). On this site, the image is credited to Stanford and to Captain Shawn; however, as stated above, Shawn died 30 days after having been interviewed, and none of the accounts of the *Cinmar* discovery indicate that he was ever met with in person. Furthermore, Stanford used the image again in a recent public lecture that was video recorded and that is freely available online (City of Fort Collins, 2014). Thus, we performed our own investigation of the *Cinmar* and its size relative to other vessels operating in the Mid-Atlantic fishery.

The *Cinmar* was constructed by J. E. Jordan of Gloucester Point, Virginia, in 1963—not the 1950s as indicated by Stanford and Bradley (2014). The boat was originally constructed for Liston K. Shackelford Jr., the “Scallop King” of Gloucester Point (Daily Press [Newport News, Virginia], 2006). Named for his children, Cindy and Mark, the boat was



**Fig. 2.** Photograph of the *Cin-Mar* under construction by J.E. Jordan of Gloucester, Virginia, in 1963. Image provided by Julie Hendrick of Jordan Marine Service of Gloucester Point, Virginia. Arrow points to an adult man standing next to the boat for scale.

considered the largest vessel constructed and launched in Gloucester County (Daily Press [Newport News, Virginia], 2006). It is important to note that the correct spelling of the vessel is “*Cin-Mar*,” although in the archaeological literature and some online databases the hyphen is omitted. The *Cinmar* first appears in the 1965 *Merchant Vessels of the United States (Including Yachts)* with the official registration number 293421 (U.S. Treasury Department, 1965). The vessel is listed as having a gross tonnage of 116 tons, a net tonnage of 79 tons, a registered length of 74.3 ft, a breadth of 20.4 ft, a depth of 11.5 ft, and an engine capacity of 457 hp. Elsewhere, the *Cinmar* is described as having an overall length of 82 ft (e.g., Daily Press [Newport News, Virginia], 2006, 2008). The *Cinmar* can be traced both by its name and by its registration number through the annual merchant vessel registries of the 1960s and 1970s, and these dimensions remain constant. The homeport of the *Cinmar* is listed as Newport News, Virginia, and the owner of the vessel is listed as *Cinmar* of Gloucester, Inc., a company affiliated with S & S Seafood, owned and operated by Liston Shackelford. No other vessels named *Cinmar* are listed in the registry throughout this time. Thus, there was only one boat operating by this name, in this location, during this time period. The boat was sold in 1979 or early 1980, renamed the *Misty Cape*, and captained by Stanley Bayley. In mid-May 1980 the boat was severely damaged when it was hit by an oil tanker roughly 22 mi south of Shinnecock, New York (Pollack, 1980). It sank in roughly five minutes (Lewiston Daily Sun, 1980a,b).

Comparison of the *Cinmar*’s dimensions to all wooden-hulled fishing vessels built since 1960 and with home ports in the Mid-Atlantic fishery (as listed by the U.S. Coast Guard, 2014) indicates that it was one of the largest vessels operating in the region—even in comparison to modern wooden-hulled vessels—and that it was well above average in terms of engine power (Fig. 1). These dimensions and comparisons clearly contradict Stanford and Bradley’s (2014) assertion that the *Cinmar* was smaller than modern dredgers and that it was not capable of pulling heavy loads or of dredging long distances.

<sup>1</sup> LORAN, an acronym for “long-range navigation,” was a system of hyperbolic radio navigation developed during World War II. It was commonly used for commercial navigation between the 1950s and 1980s. The United States’ LORAN system was terminated on Feb. 8, 2010.



**Fig. 3.** Photograph of the *Cin-Mar* fully constructed and docked. Digital image by April Bayley; original in possession of Stanley Bayley, captain of the boat when it sank. Note that the plaque affixed to the photograph identifies the boat as fishing vessel (FV) *Cin-Mar* of Gloucester Point, Virginia. Although the vessel was officially renamed *The Misty Cape*, the vessel sank before the name was applied to the hull. The arrow pointing to the stern indicates that the *Cin-Mar* in Bayley's photograph has a transom (or possibly a turtle-back) that extends upwards above the side rails of the boat. The transom of the boat shown by Stanford and Bradley does not extend above the side rails (compare with Stanford and Bradley (2014: 619), Fig. 2).

Moreover, Stanford and Bradley (2014: 619) provide an image of the *Cinmar* under construction, “illustrating its small size relative to modern scallop vessels.” The small size of the vessel in this image contradicts the registered dimensions of the *Cinmar*, its relative size to all other registered wooden-hulled fishing vessels as indicated by our statistical analysis (Fig. 1), as well as its historical description as the “largest boat built and launched in Gloucester County” (Daily Press [Newport News, Virginia], 2006). We thus obtained images of the *Cinmar* from its builder, J. E. Jordan of Gloucester, as well as from Captain Bayley (Figs. 2–3). Our images question whether the vessel shown in the image provided by Stanford and Bradley is Captain Shawn's *Cinmar*. Beyond the obvious differences in color and shape, and the fact that the vessel depicted in our images matches the size of Captain Shawn's *Cinmar*, the reader should note that “*Cinmar*” is spelled correctly, i.e., “*Cin-Mar*,” on the hull of the boat in the image provided by Captain Bayley.

As noted above, no other vessel bearing this name is listed as operating as a merchant (fishing) vessel or private yacht in the U.S. Bureau of Customs registries between the 1965 and 1980. Our research did, however, identify two other vessels with the name “*Cinmar*.” One is an industrial vessel operating out of Seldovia, Alaska. The other is the *Cin Mar II*, constructed in 1980 and later renamed the *Capt. Fella*. Both boats have steel hulls and can easily be distinguished from both the original *Cinmar* and the vessel depicted by Stanford and Bradley (2014). We thus do not know from where or by what means Stanford and Bradley acquired a picture of a small vessel with the name “*Cinmar*” on its hull, but we question whether the vessel in the picture they provide is the same as that which was registered as a fishing vessel operating out of Virginia in the 1960s and 1970s, that was captained by Charles Thurston Shawn, and that allegedly dredged up the mastodon remains and biface.

#### 4. Conclusions

Until clearly and reliably addressed, the gravity of the discrepancies and factual inaccuracies presented above indicates that there is no evidence that the stone blade and the mastodon remains were associated or where exactly either was originally discovered. Going further, given the reported inconsistencies in the blade's history, there is no confirmable evidence currently available that demonstrates that it was even dredged up by the *Cinmar*. Thus, even in the event that the same, original underwater mastodon site is eventually empirically proven to be re-located at some point in the future, this re-discovery would not provide context for, or validate, the stone blade's association with it.

#### Acknowledgments

We thank the following people and institutions for helping us with our research, either through telephone interviews or email: Captain Stanley Bayley, Nancy Bayley, April Bayley, Sylvia Cannon (Captain Thurston Shawn's sister), Becky Coore, Kim Demory, Richard Dodds, Kemal Eren, Taner Eren, Aaron Greenspan, Julie Hedrick, Erin Lopater, John A. Musick, Dean Parker, Liz Ruth-Abramian, Lynne Phillips, Jean Tanner, Carla Welsh, Calvert Marine Museum, CDII Inc. t/a Jordan Marine, Chesapeake Bay Maritime Museum, Coast Guard Sector Hampton Roads (Portsmouth, VA), Gwynn's Island Museum, Ferdinand Hamburger Archives (Milton S. Eisenhower Library, Johns Hopkins University), Hampton Roads Naval Museum, Los Angeles Maritime Museum, The Mariners' Museum and Park, the National Vessel Documentation Center, the Port of Virginia, Think Computer Corporation, the Virginia Institute of Marine Science, the USCG Historian's Office, and the USCG Navigation Center. We also thank David Meltzer, Brian Andrews, and Briggs Buchanan for valuable discussions during the course of our research. We are grateful to Andy Howard and the anonymous reviewers for providing comments that substantially improved this paper.

#### References

- Boulanger, M.T., Eren, M.I., 2015. On the inferred age and origin of lithic bi-points on the Eastern Seaboard and their relevance to the Pleistocene peopling of North America. *Am. Antiq.* 80, 134–145.
- Bradley, B., Stanford, D., 2004. The North Atlantic ice-edge corridor: a possible Paleolithic route to the new world. *World Archaeol.* 36, 459–478.
- Bradley, B., Stanford, D., 2006. The Solutrean–Clovis connection: reply to Straus, Meltzer, and Goebel. *World Archaeol.* 38, 704–714.
- City of Fort Collins, 2014. Finding America – Seeking New Paleolithic Paradigms. December 4, 2014. Electronic document, <http://www.youtube.com/watch?v=9T2XhKiU0hA> (accessed February 7, 2015).
- Collins, M., Stanford, D., Lowery, D., Bradley, B., 2013. North America before Clovis: variance in temporal/spatial cultural patterns, 27,000–13,000 cal yr BP. In: Graf, K., Ketron, C., Waters, M. (Eds.), *Paleoamerican odyssey*. Center for the Study of the First Americans. A&M University Press, College Station, Texas, pp. 521–539.
- Daily Press [Newport News, Virginia], 2006. Obituary: Liston K. Shackleford Jr. 28 November. Newport News, Virginia.
- Daily Press [Newport News, Virginia], 2008. Obituary: Charles Thurston Shawn. 9 September. Newport News, Virginia.
- Dulik, M.C., Zhadanov, S.I., Osipova, L.P., Askapull, A., Gau, L., et al., 2012. Mitochondrial DNA and Y chromosome variation provides evidence for a recent common ancestry between Native Americans and Indigenous Altaians. *Am. J. Hum. Genet.* 90, 229–246.
- Eren, M.I., Patten, R.J., O'Brien, M.J., Meltzer, D.J., 2013. Refuting the technological cornerstone of the ice-age Atlantic crossing hypothesis. *J. Archaeol. Sci.* 40, 2934–2941.
- Eren, M.I., Patten, R.J., O'Brien, M.J., Meltzer, D.J., 2014. More on the rumor of “intentional overshot flaking” and the purported ice-age Atlantic crossing. *Lithic Technol.* 39, 55–65.
- Eriksson, A., Betti, L., Friend, A.D., Lycett, S.J., Singarayer, J.S., et al., 2012. Late Pleistocene climate change and the global expansion of anatomically modern humans. *Proc. Natl. Acad. Sci.* 109, 16089–16094.
- Ghose, T., 2014. In Images: A Mastodon Skull and Tool from Chesapeake Bay. Live Science (<http://www.livescience.com/47290-images-chesapeake-mastodon-tool.html>, accessed 31 January 2015).
- Goebel, T., Waters, M.R., O'Rourke, D.H., 2008. The Late Pleistocene dispersal of modern humans in the Americas. *Science* 319, 1497–1502.
- Gustavus Adolphus College, 2012. Dennis J. Stanford at Nobel Conference 44 (Electronic document, <http://www.youtube.com/watch?v=uCWyu6RCCL>, accessed December 1, 2014).



- Gwynn Island Museum, a. The Gwynn's Island Museum; "For a Glimpse into the Past." Electronic document, [http://gwynnsislandmuseum.org/page\\_2.html](http://gwynnsislandmuseum.org/page_2.html) (accessed December 14, 2014).
- Gwynn Island Museum, b. Earliest Man Made Tool Found in the Americas; The Cinmar Discovery. Electronic document, <http://gwynnsislandmuseum.org/cinmar.html> (accessed December 14, 2014).
- Kashani, B.H., Perego, U.A., Olivieri, A., Angerhofer, N., Gandini, F., et al., 2012. Mitochondrial haplogroup C4c: a rare lineage entering America through the ice-free corridor? *Am. J. Phys. Anthropol.* 147, 35–39.
- Lewis, S.E., 2007. Gwynn's Island Museum: Museum Within a Museum. Daily Press—Middle Peninsula Edition 8 November. Newport News, Virginia (Electronic version, available: [http://articles.dailypress.com/2007-11-08/news/0711080080\\_1\\_first-museum-seafaring-heritage-algonquin-indians](http://articles.dailypress.com/2007-11-08/news/0711080080_1_first-museum-seafaring-heritage-algonquin-indians), accessed December 29, 2014).
- Lewiston (Maine) Daily Sun [Lewiston, Maine], 1980a. Maine Fisherman Claims Boat was Hit by Tanker. (22 May, p. 10. Lewiston, Maine. (<http://news.google.com/newspapers?nid=1928&dat=19800522&id=WAYgAAAAIBAJ&sjid=IWQFAAAIBAJ&pg=1835,4444446>)).
- Lewiston (Maine) Daily Sun [Lewiston, Maine], 1980b. Seaborne Hit-and-Run. 26 May, p. 4. Lewiston, Maine. (<http://news.google.com/newspapers?nid=1928&dat=19800526&id=WgYgAAAAIBAJ&sjid=IWQFAAAIBAJ&pg=5998,5209052>).
- Lowery, D., 2009. Geoarchaeological Investigations at Selected Coastal Archaeological Sites on the Delmarva Peninsula: The Long Term Interrelationship Between Climate, Geology, and Culture. (Ph.D. dissertation). Department of Geology, University of Delaware.
- Marble, J., 1995. Looking Back. Daily Press—Middle Peninsula Edition 3 March. Newport News, Virginia (Electronic version, available: [http://articles.dailypress.com/1995-03-03/news/9505020186\\_1\\_island-museum-donated-building](http://articles.dailypress.com/1995-03-03/news/9505020186_1_island-museum-donated-building)).
- McCloud, T., 1991. Island Treasures on Display. Daily Press—Middle Peninsula Edition 11 December. Newport News, Virginia (Electronic version, available: [http://articles.dailypress.com/1991-06-22/news/9106230120\\_1\\_displays-museum-first-ferry](http://articles.dailypress.com/1991-06-22/news/9106230120_1_displays-museum-first-ferry)).
- McGee, J.A., Tillett, R.H., 1983. Hangs and Obstructions to Trawl Fishing: Atlantic Coast of the United States. University of North Carolina, Chapel Hill (Sea Grant Publication no. UNC SG-83-01).
- Meltzer, D.J., 2009. First Peoples in a New World: Colonizing Ice Age Americas. University of California Press, Berkeley.
- O'Brien, M.J., Boulanger, M.J., Collard, M., Buchanan, B., Tarle, L., Straus, L.G., Eren, M.I., 2014a. On thin ice: problems with Stanford and Bradley's proposed Solutrean–Clovis colonization. *Antiquity* 88, 606–613.
- O'Brien, M.J., Boulanger, M.J., Collard, M., Buchanan, B., Tarle, L., Straus, L.G., Eren, M.I., 2014b. Solutreanism. *Antiquity* 88, 622–624.
- O'Rourke, D.H., Raff, J.A., 2010. The human genetic history of the Americas: the final frontier. *Curr. Biol.* 20, R202–R207.
- Oppenheimer, S., Bradley, B., Stanford, D., 2014. Solutrean hypothesis: genetics, the mammoth in the room. *World Archaeol.* 46, 752–774.
- PalisadesPrehistory, 2013. A Visit to the Gwynn Island Museum. July 24, 2013. Electronic document, <https://www.youtube.com/watch?v=qPzkC4qkt6Q> (accessed December 1, 2014).
- Philips, K., 2014. Solutrean seal hunters? Modeling trans-Atlantic migration parameters fundamental to the 'Solutrean solution' for the peopling of the Americas. *J. Anthropol. Res.* 70, 573–600.
- Pollack, S., 1980. Trawler meets tanker, sinks. *The East Hampton Star* (newspaper). Vol. XCV, No. 38 (Thursday, May 22).
- Preston, D., 1997. The Lost Man. *New Yorker*. pp. 70–78 (June 16).
- Raff, J.A., Bolnick, D.A., 2014. Palaeogenomics: genetic roots of the first Americans. *Nature* 506, 162–163.
- Raghavan, M., Skoglund, P., Graf, K., Metspalu, M., Albrechtsen, A., Moltke, I., Rasmussen, S., Stafford, T., Orlando, L., Metspalu, E., Karmin, M., Tambets, K., Rootsi, S., Mägi, R., Campos, P., Balanovska, E., Balanovsky, O., Khushnudinova, E., Litvinov, S., Osipova, L., Fedorova, S., Voevoda, M., DeGiorgio, M., Sicheritz-Ponten, T., Brunak, S., Demeshchenko, S., Kivisild, T., Villem, R., Nielsen, R., Jakobsson, M., Willerslev, E., 2014. Genome sequence of an Upper Palaeolithic Siberian reveals shared origins for Native Americans and Western Eurasians. *Nature* 505, 87–91.
- Rasmussen, M., Anzick, S., Waters, M., Skoglund, P., DeGiorgio, M., Stafford Jr., T., Rasmussen, S., Moltke, I., Albrechtsen, A., Doyle, S., Poznik, G., Gudmundsdottir, V., Yadav, R., Malaspina, A.-S., White, S., Allentoft, M., Cornejo, O., Tambets, K., Eriksson, A., Heintzman, P., Karmin, M., Korneliusson, T., Meltzer, D., Pierre, T., Stenderup, J., Saag, L., Warmuth, V., Lopes, M., Malhi, R., Brunak, S., Sicheritz-Ponten, T., Barnes, I., Collins, M., Orlando, L., Balloux, F., Manica, A., Gupta, R., Metspalu, M., Bustamante, C., Jakobsson, M., Nielsen, R., Willerslev, E., 2014. The genome of a Late Pleistocene human from a Clovis burial site in Western Montana. *Nature* 506, 225–229.
- Stanford, D., 1999. Alternative views on the peopling of the Americas. Paper Presented at the Clovis and Beyond Conference, Santa Fe, New Mexico.
- Stanford, D., Bradley, B., 2000. The Solutrean solution. *Sci. Am. Discov. Archaeol.* 2, 54–55.
- Stanford, D., Bradley, B., 2002. Ocean trails and prairie paths? Thoughts about Clovis origins. In: Jablonski, N. (Ed.), *The First Americans: The Pleistocene Colonization of the New World*, San Francisco: Memoirs of the California Academy of Sciences, San Francisco. vol. 27, pp. 255–271.
- Stanford, D., Bradley, B., 2012. Across Atlantic Ice: The Origin of America's Clovis Culture. University of California Press, Berkeley.
- Stanford, D., Bradley, B., 2014. Response to O'Brien et al. *Antiquity* 88, 614–621.
- Stanford, D., Lowery, D., Jodry, M., Bradley, B., Kay, M., Stafford, T., Speakman, R., 2014. Evidence for a possible Paleolithic occupation of the Eastern North American continental shelf at the Last Glacial Maximum. In: Evans, A., Flatman, J., Flemming, N. (Eds.), *Prehistoric Archaeology on the Continental Shelf*. Springer, New York, pp. 73–93.
- Stanford, D., Stenger, A. (Co-Chairs), 2014. Pre-Clovis in the Americas: International Science Conference Proceedings. CreateSpace Independent Publishing Platform; Smithsonian Institution ed.
- Stevenson, D., Chiarella, L., Stephan, D., Reid, R., Wilhelm, K., McCarthy, J., Pentony, M., 2004. Characterization of the fishing practices and marine benthic ecosystems of the northeast U.S. shelf and an evaluation of the potential effects of fishing on essential fish habitat (NOAA technical memorandum NMFS-NE-181). Report Prepared for the U.S. Department of Commerce, Woods Hole, MA.
- Straus, L.G., 2000. Solutrean settlement of North America? A review of reality. *Am. Antiq.* 65, 219–226.
- Straus, L.G., Meltzer, D.J., Goebel, T., 2005. Ice age Atlantis? Exploring the Solutrean–Clovis 'connection'. *World Archaeol.* 37, 507–532.
- U.S. Coast Guard, 2014. Merchant Vessels of the United States. Digital Database Dated 4 August. Available at: [https://homeport.uscg.mil/mycg/portal/ep/contentView.do?channelId=-18374&contentId=166847&programId=91343&programPage=%2Fep%2Fprogram%2Feditorial.jsp&pageTypeId=13489&contentType=EDITORIAL&BV\\_SessionId=@@@1523309175.1419969410@@@&BV\\_EngineId=cccdadgemmhifmjcfcgkmdfhdfgo.0](https://homeport.uscg.mil/mycg/portal/ep/contentView.do?channelId=-18374&contentId=166847&programId=91343&programPage=%2Fep%2Fprogram%2Feditorial.jsp&pageTypeId=13489&contentType=EDITORIAL&BV_SessionId=@@@1523309175.1419969410@@@&BV_EngineId=cccdadgemmhifmjcfcgkmdfhdfgo.0) (Accessed December 30, 2014).
- U.S. Treasury Department, 1965. Merchant Vessels of the United States 1965 (Including Yachts). U.S. Government Printing Office, Washington, D.C.
- Westley, K., Dix, J., 2008. The Solutrean Atlantic hypothesis: a view from the ocean. *J. North Atl.* 1, 85–98.